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ABSTRACT

Measures of psycholinguistic and reading abilities of 25 educable mentally handicapped (EMR) good readers and 25 EMR poor readers in the intermediate and junior high school special education classes were compared with one way analyses of covariance, using chronological age, mental age, and IQ as covariates. In comparison, the good reader grouped showed significantly higher abilities in auditory association, auditory reception, grammatic closure, manual expression, visual closure, visual sequential memory, automatic level of organization, representation level of organization, auditory communication, visual communication, and psycholinguistic age; and in average reading, word recognition, oral reading, silent reading, and listening comprehension. Correlational analyses revealed that psycholinguistic age was a more powerful predictor of average reading than mental age and that IQ did not correlate with average reading at all. (Author)

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Abstract

Measures of psycholinguistic and reading abilities of 25 EMR good readers and 25 EMR poor readers in the intermediate and junior high school special education classes were compared with one-way analyses of covariance, using chronological age, mental age, and IQ as covariates. In comparison, the good reader group showed significantly higher abilities in auditory association, auditory reception, grammatic closure, manual expression, visual closure, visual sequential memory, automatic level of organization, representational level of organization, auditory communication, visual communication, and psycholinquistic age; and in average reading, word recognition, oral reading, silent reading, and listening comprehension.

Correlational analyses revealed that psycholinquistic age ($r = .68$, $p < .001$) was a more powerful predictor of average reading than mental age ($r = .33$, $p < .05$) and that IQ did not correlate with average reading at all.

* Paper to be presented to the 1972 AERA Meeting.

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That the mentally retarded children read below their mental age capacities has been reported by most studies on the reading achievement of mentally retarded students (Kirk, 1964). Intelligence and the capacity for learning are looked upon by some theorists as a composite of many language and perceptual motor skills that are essentially learned and can be improved (Hunt, 1966). Furthermore, according to Carroll (1967), it is possible that "the mental abilities of mentally retarded children as manifested in language development will reveal themselves as greater than we might otherwise think them to be."

Mentally retarded children whose environmental or educational background is responsible for the uneven development of their underlying perceptual and conceptual structures may be viewed as learning disability cases rather than simply slow developers. The concept of learning disabilities implies that uneven development can be discovered through testing and remediated through education (Kirk, 1968). If this theory is valid, it suggests the possibility that certain learning characteristics of mentally retarded children may be prone to underachievement, particularly when reading is taught by purely conventional methods. This possibility led to the inception of the present study.

The purpose of this investigation was to determine why some public school educable mentally retardates (IQ 50-80) learn to read while others do not through a comparison of the psycholinquistic and reading abilities of good and poor readers. This study attempted to answer these specific questions: (1) What psycholinguistic strengths and weaknesses are present in public school EMR good readers compared to EMR poor readers? (2) What reading competencies are present in public school EMR good readers compared to EMR poor readers? and (3) What psycholinguistic and reading measures are most capable of diagnosing reading problems of the EMR?

METHOD

Subjects

The subjects involved in this study were 50 educable mentally retarded students, with IQ ranging from 50 to 80, drawn from a total population of 162 students in the intermediate and junior high school special education classes for the mentally retarded in a southwestern Pennsylvania school district. Of the 50 subjects 25 were good readers (16 males, 9 females) and the other 25 were poor readers (19 males, 6 females).

Procedures

The criteria for the selection of the sample was as follows: All subjects were between the ages of 10.6 and 15.6 years. They reached a minimum mental age of 6.5 and were within the educable mentally retarded classification, IQ 57-80, as measured by the Stanford-Binet Intelligence Test Form L-M. They were free from any known physical and sensory handicaps.

The subjects' reading expectancy was estimated by their mental age less five years (Kennedy, 1971). Subjects in the poor reader group achieved an average reading grade below 2.5 as measured by the Spache Diagnostic Reading Scales. They achieved six months or more below a second grade expectancy and one year below a third grade expectancy. Subjects in the good reader group achieved an average reading grade of 3.0 or above as measured by the Spache Diagnostic Reading Scales, with their reading characterized as being close to or above their reading expectancy.

Subjects who were reading above the 2.5 grade level but still a year or more below their expectancy were omitted from the study. The 2.5 to 3.0 difference between the "poor reader" and "good reader" groups was planned in order to avoid any overlap between categories. While this requirement reduced the possible number of students who could be considered for the study, it was expected to provide a clear comparison of the underlying attributes of the poor reader and good reader.

Instruments

Instruments administered to the subjects were the Stanford-Binet Intelligence Scale Form L-M (Terman and Merrill, 1960), the Diagnostic Reading Scales (Spache, 1963), and the Illinois Test of Psycholinguistic Abilities (Kirk, McCarthy, and Kirk, 1968).

The Stanford-Binet Intelligence Scale Form L-M is an individual instrument which provides a set of tests for each of 20 levels of ability, starting with tests suitable for the average 2-year old and going up to four levels suitable for differentiating the abilities of adults. This instrument was used to yield the measures of IQ's and MA's.

The Spache Diagnostic Reading Scales is a series of individually administered tests including three word recognition lists which range in difficulty from grades 1.3 to 6.5 and 22 reading passages of graduated difficulty from grades 1.6 to 8.5. This instrument was used to measure oral reading, silent reading, listening comprehension, word recognition, and average reading.

The Illinois Test of Psycholinguistic Abilities (ITPA) 1968 revised edition is a diagnostic instrument which attempts to measure the child's cognitive and linquistic abilities on a three dimentional psycholinguistic model: channels of communication (visual-motor and auditory-vocal), psycholinquistic processes (receptive, organizing, and expressive), and levels of organization (automatic and representational). The ITPA consists of twelve subtests: auditory-vocal association, auditory closure, auditor, reception, auditory sequential memory, grammatic closure, manual expression, sound blending, verbal expression, visual-motor association, visual closure, visual reception, and visual sequential memory. Five additional composite measures: automatic level, representational level, auditory communication, visual communication, and psycholinguistic age are yielded from these twelve subtests.

RESULTS

EMR Good Readers versus EMR Poor Readers

To determine similarities and differences between EMR good readers and EMR poor readers with respect to their reading and psycholinguistic abilities, one-way analyses of covariance were carried out with chronoligical age, mental age, and IQ as covariates. The results are shown in Table 1.

Insert Table 1 here

Inspection of the table reveals that all the five reading measures (average reading, word recognition, oral reading, silent reading, and listening comprehension) differentiated the good readers from the poor readers well beyond the .001 level of significance.

As to the psycholinguistic abilities as measured by the 17 ITPA scores, no mean differences were found between the two groups on auditory closure, auditory sequential memory, sound blending, verbal expression, visual association, and visual reception.

The remaining six individual-measures and all the five composite-ITPA measures, however, significantly differentiated the good readers from the poor readers. The good reader group scored significantly higher than the poor reader group on auditory association ($p < .01$), auditory reception ($p < .001$), grammatic closure ($p < .001$), manual expression ($p < .05$), visual closure ($p < .05$), visual sequence memory ($p < .01$); and automatic level of organization ($p < .001$), representational level of organization ($p < .001$), auditory communication ($p < .01$), visual communication ($p < .01$), and psycholinguistic age ($p < .001$).

Correlates of Average Reading Score

Product-moment correlations were calculated between the subjects' average reading score, as measured by the Diagnostic Reading Scales, and each of the four individual reading sub-scores, each of the 17 psycholinguistic measures yielded by the ITPA (Illinois Test of Psycholinguistic Abilities), chronoligical age, mental age, and IQ as measured by the

Stanford-Binet Intelligence Scale. Table 2 summarizes the results.

Insert Table 2 here

All the four reading sub-scores proved to be very high correlates ($p < .001$) of average reading. In fact, the measures of word recognition, oral reading, and silent reading showed almost perfect correlations with the average reading score.

Of the 12 ITPA individual sub-scores, 10 were found to be significant correlates ($p < .05$) of average reading. The two ITPA scores which did not correlate with average reading were visual reception and manual expression. All the five composite ITPA measures: automatic level, representational level, auditory communication, visual communication, and psycholinguistic age correlated significantly with the average reading score beyond the .01 level. When the significance between correlations were examined with t-test it was found that the correlation at the automatic level ($r = .64$) was not significantly higher than the correlation at the representational level ($r = .54$) and that the auditory channel, with $r = .68$, had significantly higher correlation with average reading than did the visual communication, with $r = .42$ ($p < .05$).

It must be noted that IQ did not correlate with average reading at all. Furthermore, psycholinguistic age ($r = .68$, $p < .001$) was a more powerful predictor of average reading than mental age ($r = .33$, $p < .05$).

CONCLUSION

Mean differences between EMR good and poor readers with respect to psycholinguistic abilities revealed deficiencies of the poor reader group in the areas of auditory association, auditory reception, grammatic closure, manual expression, visual closure, visual sequential memory, automatic level of organization, representational level of organization, auditory communication, visual communication, and psycholinquistic age. There were no differences, however, between the two groups on auditory closure, auditory sequential memory, sound blendings, verbal expression, visual association, and visual reception.

Mean differences between groups also showed significant weakness on the part of the poor reader group in all areas of reading: word recognition, oral reading, silent reading, and listening comprehension and, as expected, average reading.

Through correlational analyses, psycholinguistic age, auditory communication, automatic level of organization, grammatic closure, representational level of organization, auditory association, and auditory reception were found to be among the best diagnostic measures of reading problems of EMR.

DISCUSSION

The information obtained from the diagnostic testing of the EMR poor readers in this study could be used as a basis for group remedial teaching in reading.

The composite psycholinguistic age score of the ITPA proved to be a much better estimate of the EMR's potential for reading. For the purpose

of determining the reading potential of the EMR, the psycholinguistic age, rather than traditional indexes such as MA, CA or IQ. appears to be more useful.

The data give evidence of inferiority in the auditory area for the mentally retarded poor readers. They are more deficient in auditory functions than in visual functions. A deprived environment may be considered as partially accounting for the lower level of development in the auditory channel (Bateman, 1968).

The EMR poor readers showed deficiencies in both the automatic and representational levels of functioning. Although various studies with the ITPA have revealed a lower automatic-level of functioning among populations with learning problems, Sumner's (Sumner, 1966) similar study comparing EMR good and poor readers obtained no difference between the automatic and representational levels. From the data obtained, there is no clear-cut mandate to emphasize one area in the teaching of reading to the detriment of the other. Rather, it appears necessary to stress both meaningful and non-meaningful skills at the same time. It may not be enough to emphasize teaching the retarded child how to decode messages if his general level of thinking ability is low. Research on problem solving with the EMRs indicates that they have difficulty gaining meaning from their environment without aid (Scheifelbusch, Copeland and Smith, 1967). Learning to read is analogus to problem solving. If meaningful aspects of reading are included along with the decoding process, the educable mentally retarded may learn to read with more facility.

The EMR poor readers were seriously retarded in the representational level functions, auditory reception and auditory association which require the ability to comprehend verbally presented materials. Teachers of reading should stress the development of word meanings along with relationships and associations.

Severe deficiencies in the poor reader group in grammatic closure, an automatic level function, may be related to auditory-representational deficit since inadequate use of standard English patterns could affect the child's ability to gain meaning from the auditory and visual clues of the environment outside his home. The child's experiences should be used as a bridge towards learning the standard English grammatical structures and models he hears in school.

Three auditory subtests, auditory closure, auditory sequential memory, and sound blending, which were significantly correlated with reading, did not show any significant difference between the two groups. It may be that the teaching of phonics might have had an effect on some of the poor readers, although these decoding skills were not sufficient to help them learn to read.

Deficiencies were noted in visual sequential memory and visual closure. Both skills are somewhat related, visual memory involving the retention of non-meaningful symbols and visual closure involving the identification of whole meaningful symbols from parts. Both skills at the automatic level of visual functioning would affect the recognition and retention of printed words. These visual perceptual memory skills could be developed when teaching reading along with the deficient auditory areas.

Visual association was significantly correlated with average reading, but revealed no significant difference between the groups. Visual reception showed no significant difference between groups and no significant correlation with average reading. The results are similar to other findings in the literature of better visual-representational compared to the auditory-representational abilities. The overcompensation in visual representational tasks (Kass, 1966) for auditorily disabled EMR readers and the overstress of visual materials in the classroom (Golden and Steiner, 1969), might explain this greater visual-representational ability on the part of the poor readers.

All the Spache Diagnostic Reading Scales subscores significantly differentiated the good readers from the poor readers. Listening comprehension revealed a lesser expected level of skill among the EMR good readers which confirms the theory of a general lower level of auditory comprehension for the general MR population.

Classroom teachers should be given training in both the new 1968 edition of the ITPA and the Spache or a similar diagnostic reading battery. In this way, teachers would better understand the diagnostic information contained in each instrument.

The true value of the ITPA lies in its remedial function. Exercises which remediate specific disability areas revealed in the ITPA are now available to classroom teachers. These exercises can be used for individual or small group teaching (Bush and Giles, 1969).

Teachers should be provided with information concerning exercises to remediate specific disability areas in their preservice or inservice training.

The results of this study demonstrated that patterns of deficiencies could be obtained from the ITPA which have implications for the remediation of reading problems. Some of the generalizations can be made about teaching reading to groups of EMR poor readers. However, each group of students should be evaluated to determine their own pattern of disabilities until further validation studies with the revised 1968 edition of the ITPA are completed.

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Table 1

Good versus Poor EMR Readers - Analyses of Covariance on 22 Dependent Measures with Chronological Age, Mental Age, and IQ as Covariates

Variate	Good Readers (N=25)		Poor Readers (N=25)		F
	Unadjusted Mean	Adjusted Mean	Unadjusted Mean	Adjusted Mean	
Average Reading	42.8	42.5	17.4	17.8	212.27***
Word Recognition	45.1	44.6	17.6	18.1	168.97***
Oral Reading	42.4	42.1	16.7	17.0	268.57***
Silent Reading	41.3	41.0	18.5	18.8	83.82***
Listening Comprehension	45.6	45.6	37.8	37.8	10.26**
Auditory Association	28.8	28.6	25.2	25.5	8.54**
Auditory Closure	22.2	21.6	19.8	20.4	1.09
Auditory Reception	37.6	37.7	31.6	31.6	13.12***
Auditory Sequential Memory	29.0	29.0	24.3	24.3	3.96
Grammatic Closure	24.2	23.7	17.9	18.3	20.81***
Manual Expression	26.4	27.0	24.4	23.9	4.61*
Sound Blending	15.1	15.3	12.8	12.6	3.67
Verbal Expression	32.6	32.2	28.2	28.7	2.88
Visual Association	25.7	26.0	24.0	23.8	3.70
Visual Closure	31.6	31.5	26.6	26.6	4.75*
Visual Reception	25.2	25.0	25.0	25.2	0.02
Visual Sequential Memory	22.8	22.8	19.2	19.1	9.29**
Automatic Level	144.8	143.9	120.5	121.4	23.67**
Representational Level	176.4	176.4	158.6	158.6	13.58**
Auditory Communication	189.3	188.1	159.9	161.4	32.52**
Visual Communication	131.7	132.3	119.2	118.6	7.91**
Psycholinguistic Age	101.2	101.1	87.4	87.5	33.41**

* $p < .05$ ** $p < .01$ *** $p < .001$

Table 2

Correlations between Average Reading and Other Variables of EMR Good and Poor Readers (N = 50)

Variable	Correlation	p
Word Recognition	.98	<.001
Oral Reading	.97	<.001
Silent Reading	.95	<.001
Listening Comprehension	.51	<.001
Auditory Association	.48	<.001
Auditory Closure	.32	<.05
Auditory Reception	.48	<.001
Auditory Sequential Memory	.38	<.01
Grammatic Closure	.62	<.001
Manual Expression	.27	n.s.
Sound Blending	.33	<.05
Verbal Expression	.37	<.01
Visual Association	.30	<.05
Visual Closure	.34	<.05
Visual Reception	.03	n.s.
Visual Sequential Memory	.43	<.01
Automatic Level	.64	<.001
Representational Level	.54	<.001
Auditory Communication	.68	<.001
Visual Communication	.42	<.01
Psycholinguistic Age	.68	<.001
Chronological Age	.35	<.05
Mental Age	.33	<.05
Intelligence Quotient	.06	n.s.